PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF
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Intestinal Perforation in Typhoid Fever.—W. OSLER (*Philadelphia Medical Journal*, January 19, 1901), in discussing perforation and perforative peritonitis in typhoid fever, directs attention to the fact that a very large proportion of the cases of perforation show conditions which are not at all characteristic, according to the general description of this condition. He believes that with proper diagnosis surgical intervention would greatly reduce the mortality from perforation, and perhaps about half the cases could be saved. The great trouble is that we know too little about the diagnosis of perforation. His recommendations are that in cases in which the occurrence of perforation is suspected a skilled diagnostician should be, if possible, in constant attendance so that the diagnosis may be made as early as possible, and if perforation occurs surgical intervention should be undertaken at once. The accident is likely to occur during the more severe cases and during the height of the disease. It occurs more frequently in cases showing diarrhœa and tympanites; of 30 cases observed at Johns Hopkins Hospital 20 had diarrhœa and 6 had both perforation and hemorrhage. If marked abdominal symptoms appear perforation should be watched for constantly. He recommends that one should be always on the alert for any distinct abdominal pain, particularly when it shows severe onset and is intense and tends to grow worse; it should be especially determined whether the pain is diffuse or localized toward the lower right side of the abdomen. One should also note whether the abdomen is flat, scaphoid, or distended, particularly whether it is uniformly distended, whether respiratory movements are present over the abdomen, and whether they are uniform and seen both above and below the navel. One should note tension and pain on palpation, muscular rigidity, and spasm, particularly in the epigastric region and right iliac fossa, and whether spasm is found by rectal examination. The liver dulness should also be watched in the middle, nipple, and mid-axillary lines; auscultatory percussion may be an aid in this. Any tenderness or fulness discovered by rectal examination is important. Blood and sloughs should be looked for in the stools and any change in their character noted. As to the general condition of the patient, any change in expression should be noted, together with increase in the rapidity of the pulse, decided change in the temperature, sudden increase in the respirations, or a shallowness or sighing character of the respiration. The occurrence of sweats, of vomiting, and of hiccough may be important, and one should also look for a change in the leucocyte count, having in mind that there is an almost constant leucopænia in typhoid fever. He describes in detail three cases in which, in the absence of typical symptoms, a diagnosis of perforation was made and operation performed. The first patient died, apparently chiefly from the effects of the disease itself. In the second case death occurred on the table. In this instance the walls of the gut were so swollen and infiltrated that sutures would not hold in the neighborhood of the perforation. In the third case complete recovery occurred. As to the general results of operation in the Johns Hopkins Hospital, Osler mentions one series of 11 cases in which 5 recoveries occurred. In all 16 cases have been operated upon, with 6 recoveries, a percentage of 37.5.

Disinfection of Typhoidal Excreta.—N. B. GWYN (*Philadelphia Medical Journal*, January 12, 1901), after insisting upon the importance of infected typhoidal urine in the dissemination of typhoid fever, reports his results in studying the effects of various antiseptics upon urine containing typhoid bacilli. In conclusion, he states that milk of lime is not deserving of the name of disinfectant. Carbolic acid is useful only in large amounts and in strong solution if a rapid action is desired. Formalin is efficient, but very expensive for ordinary use. Bichloride of mercury, chlorinated lime, and liquid chlorides are very valuable, are rapid in action, and are efficient in comparatively dilute solutions. For disinfection within five minutes he states that of a 1: 20 carbolic-acid solution one needs half the volume of the urine to be disinfected; of a 1:40 carbolic-acid solution one should use two-thirds of the volume of urine to be disinfected; while of a 1:1000 bichloride of mercury only one-fifth the volume of urine is necessary; of a 10 per cent. formalin solution, three-tenths the volume of urine should be used; of saturated chlorinated lime one-fortieth the volume of urine, and of liquid chlorides two-fifths the volume of urine. He states that the disinfection seemed to be quite as rapid in urines containing albumin as in those free from albumin. For irrigation of the bladder he states that solutions of bichloride in strengths of 1:100,000 to 1:50,000 are most successful. He considers urotropin the only substance which produces any effect when given by the mouth.

Auto-intoxication.—H. STRAUSS and H. PHILIPPSOHN (*Zeitschrift für klin. Med.*, Band xl., p. 369) discuss the excretion of enterogenous decomposition products in the urine under constant diet and insist upon the importance of constant diet in similar studies. Their researches were carried out by using a test diet, which they describe. They estimated quantitatively the amount of volatile fatty acids and ethereal sulphates in the urine and made qualitative estimations of the phenol and indican. About 100 results are reported; some of these were obtained in persons who had gastro-intestinal affections, others in patients who had no such disturbance. The normal value for volatile fatty acids in the urine was accepted as between 40 and 80. Alimentary factors were found to have no constant influence upon the excretion of the volatile fatty acids, even diarrhœa having no pronounced influence. Constipation did, however, have a notable effect upon their amount, as well as upon the aromatic oxyacids, the ethereal sulphates, the phenol, and the indican. Changes in the gastric secretion had no notable influence upon the excretion products with the exception of the ethereal sulphates. There was a general tendency to decrease of the ethereal sulphates with hyperacidity and increase with hypoacidity or anacidity. This influence was, however, not at all constant. A very marked increase in the putrefaction products was seen in two cases of disease of the liver. The most important statement which the authors make is that their results lead them to conclude there is excellent evidence that the amount of putrefaction products in the urine varies much more markedly according to the conditions of the tissues in general than in accordance with the condition of the gastro-intestinal tract; in other words, that with normal conditions of the gastro-intestinal tract or with imperfect tissue action the products of putrefaction found in the urine are much increased, while with normal tissues the products in the urine remain normal, often even when there is marked increase in the production in the intestine. They decide from this that, as a rule, when they are increased one is far better justified in speaking of "tissue intoxication" than of "gastro-intestinal intoxication," though both may be present. Finally, in discussing some observations concerning the excretion of acetone, they state that a marked increase in the fatty acids in the intestinal contents seems to increase the acetone excretion.

Post-hemorrhagic Hæmoglobinuria.—MICHAELIS (*Deutsch. med. Woch.*, 1901, xxvii., 51) reports the case of a woman who had a sudden, very extensive intra-abdominal hemorrhage from a ruptured tubal pregnancy. On the day after the hemorrhage the examination of the blood showed but 25 per cent. of hæmoglobin, and a few nucleated red blood-corpuscles. The urine, which was examined for the first time the day after the hemorrhage, was of a dark, reddish-black color, and contained a trace of albumin and abundant blood-coloring matter. The centrifugalized sediment showed a few short granular casts and hardly a single red blood-corpuscle. On the following day the hæmoglobin had increased in quantity, but a day later it had entirely cleared up. The patient made a gradual recovery, but, on the fifth day after the disappearance of the hæmoglobinuria, there were slight chilly sensations, a sudden rise of temperature to 38.6° and a fresh attack of hæmoglobinuria which lasted four days.

According to Michaelis, these attacks, occurring during the absorption of a large intra-abdominal hemorrhage, may be accounted for either by the assumption of the absorption of the coloring matter directly into the blood and its excretion by the kidneys, or by the formation of a hæmolysin, which, acting upon the blood-corpuscles of the patient, produced the hæmoglobinæmia and hæmoglobinuria.

The first possibility seems scarcely probable inasmuch as no such instance has ever been noted, urobilin alone having been found in the urine in such cases. The other possibility, however, is extremely interesting in connection with the observations of Bordet and Ehrlich and Morgenroth. These observers have shown that after continued injections of blood of an animal of one species into that of another, the serum of the animal inoculated acquires the power of dissolving the blood-corpuscles of the other animal. This power is lost by heating to a temperature of 55°, but is acquired again if a little normal serum be added. From many researches Ehrlich and Morgenroth came to the following theoretical explanation of these facts.

The actual blood-dissolving principle is present in normal serum, but fails to exercise its power because it is unable to unite with the molecules of the red blood-corpuscles. The serum of an animal which has received injections of blood differs from normal serum in that it contains a body which, on the one hand, unites with the molecules of the red blood-corpuscles, and, on the other hand, with this dissolving principle, which is present in normal serum, thus favoring the action of the latter upon the red blood-corpuscles. Ehrlich speaks of this specific body, present only in blood which has been treated by this method, as the *immune body*, the other as the *addiment*. The first he calls the *intermediate link*, the latter the *final link*. The *final link* is so unstable that it is rapidly destroyed at a temperature of 55°, while the *intermediate link* is more resistant. If, then, one heat to 55° C. the serum of an animal which has been previously treated with injections of blood the *final link* is destroyed, and the serum is thus deprived of its blood-dissolving property. But since the *final link* is present in every normal serum, the addition of a little such brings back again the blood-dissolving properties.

The origin of the *intermediate link* Ehrlich accounts for, according to his antitoxin theory, in the following manner: The molecules of the sheep's blood-corpuscles may contain special chains of atoms which may be indicated by the sign +a. In certain cells of the organism of the goat there are found chains of atoms which have the property of uniting with this +a group. This corresponding group may be indicated by the sign —a. If, then, sheep's blood be injected into a goat all the +a groups will unite with the corresponding —a groups; but inasmuch as the —a groups must have some physiological importance in the organism of the goat, the goat would of necessity suffer if these groups, which are now put out of function, were not regenerated. Therefore, the organism of the goat produces an abundance of fresh groups of —a atoms, and, indeed, according to Weigert's law, in a quantity far above that actually called for by the organism. The result is that the excess of the —a atom groups are cast off from the mother molecule and accumulate in the blood, forming thus the specific *intermediate link*.

Lately Ehrlich and Morgenroth have called attention to the fact that this *intermediate link* arises not only when the blood of an animal of one species is injected into that of another, but that a hæmolysin is obtained when one injects the blood of one goat into the blood of another. Such hæmolysins they have termed *isolysins*.

The question which now naturally arises is: Why if one injects into an animal his own blood, or if an animal absorbs rapidly an extensive extravasation, does there not arise an *autolysin*—that is, a hæmolysin which destroys its own blood-corpuscles?

One might further ask why there is not always an *autolysin* present in the blood, if, as must be the case, the blood always contains corpuscles possessing the +a groups of atoms. This latter question is easily answered, for the +a groups are not free in the blood, but are bound to the red blood-corpuscles and are, therefore, unable to unite with the —a groups wherever they may be present. For this to occur the +a groups of atoms must be present in the blood in solution, as they would be in the absorption of an extravasation. Why, then, does not an *autolysin* arise during the absorption of an extravasation? This Ehrlich explains in an interesting manner. With the absorption of an extravasation a number of molecules which possess the +a groups of atoms enter the blood and will immediately seek out in the organism the —a groups in excess and unite with them. But this is a stimulus for the organism to produce —a groups in excess and to cast them off. So that free —a groups, in other words, an *autolysin*, should escape into the circulation. But since there is no reason to assume that the +a groups are only found in the blood and not also in other organs, this *autolysin* (the —a groups) is bound not only to the blood-corpuscles but to all other cells which possess the +a groups of atoms. As a result of this, again, an excess of +a groups are produced and cast off, and these escaping in a free state into the blood constitute an *anti-autolysin*. In other words, the appearance of a small quantity of *autolysin* would constitute a stimulus for the organism to produce immediately an *anti-autolysin*. But if this idea be correct one might still expect sometimes to see evidences of the formation of an *autolysin*; this might, for instance, occur when the absorption of a large extravasation of blood occurs so quickly that the organism has not sufficient time to form a proper quantity of *anti-autolysin*. The authors, nevertheless, had never been able to observe a case of this sort. Michaelis, however, points in an extremely interesting manner to the possibility that this case, in which there occurred extraordinarily severe hemorrhage which was absorbed very rapidly and followed by hæmoglobinuria, *very probably constitutes exactly such an instance*. Ehrlich's hypothesis is, of course, unproven, but the author points out that it is the most satisfactory hypothesis for the explanation of immunity and the development of lysins which has yet been advanced.

Concerning the Antiphlogistic Action of Cold Applied to Points Distant from the Seat of Inflammation.—EMMERT (*Fortschritte der Medicin*, 1901, xix., p. 161), in Goldscheider's clinic, has repeated some experiments which were made by Samuel in 1892, with regard to the antiphlogistic action of cold applied at points distant from the seat of inflammation. Samuel noted that if croton oil were applied to one ear of the rabbit, while the other was immersed in water, the inflammation was materially delayed. In control rabbits the process came on in five hours, while in those in which the opposite ear was immersed, no signs of inflammation were to be noted throughout the experiments, which lasted up to twelve hours. On removing the ear from the water, however, the inflammation began. Samuel's explanation of this antiphlogistic action was that, owing to cooling of an extensive vascular area, the leucocytes which passed through the vessels were, for a certain length of time, deprived of their active motility. In repeating Samuel's experiments Emmert adopted a somewhat different plan, as he found it difficult to keep the rabbit's ear under water for long periods of time without bringing about conditions which interfered with the experiment. An arrangement was made by which, without much distress to the animal, one leg could be kept under water. It was found that under normal circumstances the time at which the evidences of inflammation set in varied so greatly that it was necessary to retain the leg under water for at least twelve hours, by which time, in the control animals, the inflammation invariably came on. The experiments showed that, by immersion of the lower half of the left hind leg in water at a temperature of from 12° to 15° C., the croton oil inflammation was delayed as long as the leg remained in water. Some of the experiments were continued as long as thirty hours. Another series of experiments, in which the leg was immersed after the inflammation had begun, showed distinctly that the inflammatory process stopped at the point which it had reached at the beginning of the bath.

With regard to the explanation of this phenomenon, Emmert differs from Samuel. He noted, contrary to the observations of the latter, that the temperature of the animal always fell several degrees, and that this fall in temperature always preceded the disappearance of the inflammatory process. It was found, further, that if, while the leg was still in the bath, the animal was warmed so as to prevent this fall of temperature, the inflammation occurred exactly as in the control animals. In another animal exposed simply to cold air there was also a marked fall of temperature and a material delay in the onset of the inflammation. He concludes that the observation of Samuel that the immersion of one extremity of a rabbit in a cool fluid is sufficient to hinder the development of a croton oil inflammation in another part, is true ; that, indeed, the antiphlogistic action of this procedure is even greater than Samuel suspected. Emmert's experiments, however, appear to show that the delay and prevention of the croton oil inflammation depends not upon any special action of the cold on the leucocytes in the exposed area, but upon the marked fall of temperature throughout the whole animal's body. Unfortunately, the practical application of the procedure in man is not possible, experiments by Leube and others having shown that the local application of cold in human beings produces relatively a much less fall of temperature than in animals.

Generalized Tic Convulsif Cured by Respiratory Gymnastics.—PITRES (*Journal de Médecine de Bordeaux*, 1901, xxx., p. 106) presented to the Medical and Surgical Society of Bordeaux, on February 2, 1900, a young man, aged twenty years, who had suffered for eleven years from a convulsive tic of unusual intensity. Every six or eight seconds the patient had violent spasms as rapid as if they had been provoked by electrical discharges, which resulted in quick, sharp movements of his head, trunk, or extremities, accompanied by a sudden expulsion of involuntary cries or inarticulate groans. The health of the patient was good. He was able to eat and sleep, but the movements interfered with his work and resulted in his avoiding others for fear of ridicule. It was noted that when the patient sang or counted at the top of his voice, or when he took deep, regular, rhythmical inspirations, the attacks diminished considerably in frequency, and it occurred to Pitres that they might be influenced by gymnastic respiratory exercises analogous to those which are commonly employed in the treatment of stuttering. Pitres has recently applied similar methods with success in the treatment of certain more simple tics. Three or four times a day, for ten minutes, the patient was placed with his back against a wall, and was advised to take as slow and deep respirations as possible, raising his arms during inspiration and allowing them to fall during expiration. From the beginning the attacks became less frequent. A month later the amelioration was very evident. At this time the patient had to return to his home. He continued the exercises, however, regularly, and in three months the attacks had become rare. Nine months after treatment none whatever were present, the patient was at work and was apparently entirely cured.

[This case is particularly remarkable in that so good a result appears to have been attained in a tic of so long duration.—W. S. T.]

The Freezing Point of the Blood in Typhoid Fever.—RUMPEL (*Münchener med. Wochenschrift*, 1901, xlviii., p. 223).

In the *Deutsche medicinische Wochenschrift*, 1900, No. 46, Waldvogel published some observations tending to show that the freezing point of the blood in typhoid fever differed materially from that observed under normal conditions. Rumpel, who had already made some observations upon a similar subject in an article which is shortly to appear, being inclined to doubt the methods of Waldvogel, repeated the experiments. Waldvogel's observations showed a remarkable increase in the osmotic tension of the blood in typhoid fever, which resulted in the falling of the freezing point to —1.68° C. The results were striking in that the blood concentration in an osmotic sense is very constant, the freezing point varying, according to Rumpel's observations, extremely little—from —0.55° to —0.57° C. Waldvogel, in his observations, used the blood serum of typhoid patients which had been taken for the Widal reaction, the blood having twice remained twenty-four hours upon ice. As the quantity of the serum which was used was too small for the determination of the freezing point, it was diluted several times with distilled water. Instead of the ordinary glass cylinder of Beckmann's apparatus a wide test-tube was used, and in place of the mixer the thermometer itself. Apart from the various sources of error which must be connected with this method of procedure, Rumpel saw in it no great simplification of the ordinary method; and in his observations he took 15 cm. of blood directly from the vein, introducing it immediately into the cylinder, and making the estimation immediately after defibrinating the blood, by stirring with a platinum ring. By making comparative tests according to his own method and that of Waldvogel, he was able to demonstrate the many sources of error in the former. He then made estimates of the freezing point of the blood in eleven cases of typhoid fever which were at that time in the hospital. The examinations were made at various different stages of the disease. In all instances these showed an entirely normal blood concentration in an osmotic sense—that is, the freezing point varied between —0.56° and —0.57°.

The author observes that, owing to the few investigations, one is not justified in assuming that the osmotic tension of the blood in typhoid fever is always normal, but that, in comparison to Waldvogel's twenty-two cases, his eleven, in which the examination was made in a more careful manner, showed no abnormal deviation of the freezing point.

SURGERY.

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Compression of the Pedicle of a Movable Kidney by a Distended Gall-bladder Containing Calculi.—REYMOND (*Revue de Chirurgie*, June 10, 1900) states that it is not always possible to diagnose between these two conditions, and the diagnosis of the case becomes especially difficult when the two conditions coexist, as is well shown in the author's case, which was that of a woman, aged thirty-eight years, married, had five children, and one tubal pregnancy, the latter requiring operative interference for its relief. Eight days previous to her admission to the hospital violent exertion was followed by severe pain in the right flank; this was so severe as to make her keep in bed. Examination showed an irregular pulse, fever, pinched facies, but no trace of jaundice. Vomiting was persistent on attempting to take nourishment. The urine was normal. The patient complained of being always in pain, which at times became more acute; it was felt in the hypochondrium and right flank; some pain was felt along the course of the ureter, while at times it ascended to the right shoulder. The abdomen was distended, and so sensitive on palpation as to make an examination most difficult. On palpation a hard, irregular tumor, situated somewhat deeply, was noted in the region of the gall-bladder. There was marked dulness on percussion, and further examination enabled one to limit this tumor. It descended to two fingers' breadths below a horizontal line passing through the umbilicus; to the inner side it extended to the median line, while to the outer side its limits were less precise. The tumor had a pear-shape, and moved during respiration. Beyond the limits of this tumor was a second mass of more homogeneous consistence, situated backward below and to the outer side of the first tumor, and having the form of an enlarged kidney. These two masses could not be separately moved; they gave the impression of a bilobar tumor and not that of two separate and distinct tumors.